

### **REMARKS**

Claims 1, 2 and 4-14 are pending in the application. Claim 1 has been amended. Claims 12-14 are new. No new matter is added. In light of the foregoing amendments and the following remarks, Applicants earnestly solicit favorable reconsideration.

Support for amended claim 1 and newly added claims 12-14 can be found, for example, in figures 5-9.

#### **On the Merits**

##### **Claim Rejections - 35 U.S.C. § 112**

Claims 1, 2 and 4-11 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

The Examiner contends that it is unclear whether Applicants are claiming a device or a method of using a device. The Examiner contends that the phrase, "the fine vacuum tube element and the other electronic elements transmitting signals to and from each other," causes this problem.

However, the above recited passage is merely functional language which imparts a structural feature. The structural feature would be that the respective components are, for example in "communication" with each other via the transmitting. That is, the respective components are somehow connected to each other; e.g. electronically, physically, etc.

As such, Applicants respectfully submit that the rejection be withdrawn.

Claim Rejections - 35 U.S.C. § 103

Claims 1, 2, 5-8 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Mori* (US 5,247,223). Concurrently, claims 1, 2, 4, and 9-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Okada* (US 5,003,360) in view of *Mori*.

Independent Claim 1:

Independent claim 1 requires:

An integrated circuit comprising a fine vacuum tube element and other electronic elements integrated and formed on a substrate of a semiconductor,

a magnetic field generating unit in communication with said fine vacuum tube element,

the fine vacuum tube element and the other electronic elements transmitting signals to and from each other;

wherein an interference system is constructed from said fine vacuum tube element.

Applicants have added an additional feature to independent claim 1. Specifically, Applicants include the magnetic field generating unit. This feature is not disclosed or fairly suggested by the cited references. *Okada* discloses:

...so that electron wave conditions at the heterojunction are locally influenced by an **electric field**.... (Emphasis added.)

As is apparent, an electric field does not disclose or fairly suggest a “magnetic field generating unit” as recited in claim 1.

Furthermore, *Mori* discloses:

By changing the phase of the electron wave which passes on the right side of the blocker B in FIG. 2 with a gate voltage which is applied to the gate G, the interference of the electron waves which are joined at the anode A is controlled, thereby allowing a transistor operation to be performed.

Thus, the voltage applied in *Mori* does not disclose or fairly suggest a “magnetic field generating unit” as recited in claim 1.

Furthermore, Applicants respectfully disagree with the Examiner’s implication that it is obvious to use fine vacuum tube elements with integrated circuits. This is a novel and non-obvious feature of the claimed invention.

As such, Applicants respectfully submit that the rejection be withdrawn.

Dependent Claim 7:

Applicants respectfully submit that the features of claim 7 are not disclosed by the references. Specifically, claim 7 recites a “thermionic cathode.” *Mori*, in column 6, last sentence, discloses a “cold cathode.” Applicants respectfully assert that a “cold” cathode does not disclose or fairly suggest a “thermionic” cathode. The two respective cathodes are different.

Dependent Claim 8:

Applicants respectfully submit that the features of claim 8 are not disclosed by the references. Specifically, claim 8 recites a carbon nano-tube attached to a “thermionic cathode.” This feature is **not** well known in the art and is **not** obvious. That is, it *may* be obvious to attach

a carbon nano-tube to a “cold” cathode, but it is not obvious to attach a carbon nano-tube to a thermionic cathode.

If the Examiner insists this feature is obvious, Applicants kindly ask the Examiner to show such a structure in the prior art, a carbon nano-tube attached to a thermionic cathode.

Dependent Claims 9 and 10:

Applicants assure the Examiner that a Mach-Zehnder interferometer can be used in association with electrons. The interference is a phenomenon caused by the nature of a wave and it is possible to represent electrons as a de Broglie wave.

In view of the above, Applicants respectfully submit that their claimed invention is allowable and ask that the rejection under 35 U.S.C. §112 and the rejections under 35 U.S.C. § 103 be reconsidered and withdrawn. Applicants respectfully submit that this case is in condition for allowance and allowance is respectfully solicited.

If any points remain at issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the local exchange number listed below.

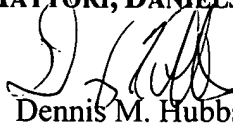
Application No.: 10/767,167  
Art Unit: 2891

Amendment under 37 C.F.R. § 1.111  
Attorney Docket No.: 042054

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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